

Research Project AZ o8/F/22

“Necessity by Design:

Mathematic of Rhetoric in Middle Byzantine Culture”

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This document is the consolidated version of Chiara D’Agostini’s final report on the project AZ o8/F/22. The reports are built on the previous interim reports submitted at the end of the first year of the project (31st August 2023) and are meant to account for the work done and the progress made during the two years of the project.

Final Report

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1. Project description and overview of the progress

1.1 Project Summary

The Necessity by Design (NbD) project aims to explore the conceptual and visual links between mathematical/geometrical reasoning and rhetoric in the middle Byzantine period (843–1204). It looks at how graphic and discursive practices associated to mathematics and geometry contributed to reinforce the epistemic status of rhetoric among the elites of the empire. It also contributes to pre-modern intellectual history and complements recent developments in ancient and early modern history of mathematics by providing access to new manuscript material (texts, diagrams, graphs) from a historical period and a geographical area usually disregarded in these fields of enquiry.

To carry out this research, the focus has been on the so-called *corpus Hermogenianum*, a staple in the curriculum of the Constantinopolitan elite. Research is concentrated both on the manuscripts of the *corpus* – which has a recent and reliable edition, but whose marginalia have been only partly investigated – and on the Byzantine commentaries authored from the 9th to the 12th century – only partly available in print editions. This chronological focus has been chosen because the interest in Hermogenes seems to peak in this period: it produced an amount of authorial and innovative commentaries much larger than the periods immediately before and after. These introductions and commentaries – still largely understudied – offer a privileged point of view on debates, conversations, theories regarding the value of rhetoric and the links with the discursive practices of other fields of knowledge such as mathematics and geometry. The *corpus*, as we argue, provided the ideal source material to conceptualize rhetoric in mathematical and geometrical terms and to reinforce its epistemic status. Geometrical diagrams contributed to the objective too: they were one of the means through which ancient Greek mathematical thought presented necessary starting points leading to proofs.

Both textual and visual sources have been examined from the perspective of cognitive history. If, on the one hand, aspects of language and communication are clearly central to rhetorical training, on the other, engagement with learning tools and processes transmitted or described by our sources promoted embodied and distributed cognition. Along the lines of the two types of sources the project takes into account, the NbD research project comprises two distinct but complementary work packages that aim to look at, respectively, discursive

definitions of rhetoric (WP 1.1) and at the visualization strategies such as graphs, diagrams and tables (WP 1.2) featuring in the manuscripts of the *Corpus* and of its commentaries.

1.2 Objectives

The project pursues the following goals:

- to reassess and investigate the conceptual and visual links between mathematical/geometrical reasoning and rhetoric in the middle Byzantine period;
- to explore the cognitive tools that contributed to bringing rhetoric closer to mathematics;
- to identify and analyze discursive definitions of rhetoric in the manuscripts of the *Corpus Hermogenianum* and of its commentaries (**WP 1.1**);
- to categorize and investigate visualizations strategies such as graphs, diagrams and tables in the manuscripts of the *Corpus* and of its commentaries (**WP 1.2**);
- to contribute to the ongoing research on the fluid boundaries between disciplines in the *quadrivium* (arithmetic, geometry, music and astronomy) and the *trivium* (grammar, rhetoric, dialectic).

1.3 Research WP 1.1 – progress

First year

Within the NbD, PI's work focused on the way middle byzantine commentaries conceptualized rhetoric in order to identify and analyze lexical and conceptual links with fields of knowledge such as mathematics and geometry commonly conceived of as distant from the art of speaking. In the original plan, analysis was to concentrate on:

- description of modes of teaching (pedagogical techniques);
- lexical overlaps;
- metaphors connected to the domain of knowledge;
- self-representation of rhetors and commentators.

The chosen methodology consisted in identifying key passages in the base text to subsequently look at the later engagements with them by the relevant Byzantine commentators.

The WP research included for the first year two tasks and two milestones, as follows:

T1.1.1 To identify critical passages in the Hermogenian treatises lending themselves to epistemic critical discussion.

T1.1.2 To collect the relevant commentaries on the passages collected in T1.1 in the set of sources.

M1.1.1 Creation of a set of critical passages from the Hermogenian treatises (Month 6)

M1.1.2 Definition and edition of the corpus of the relevant exegetical glosses in both anonymous and authorial commentaries (Month 12)

Within the passages singled out through **T1.1.1** and **T1.1.2** research has focused on the opening of Hermogenes' *On Issues*, as the first few lines of the treatise encapsulate the definition of rhetoric. Such a definition is stoic in essence and based on Zeno's definition of art. This was a crucial point in orienting research, as Zeno's phrasing once applied to rhetoric, proves to be both capacious and flexible. It accommodates different attitudes toward the art of speaking and works as a hinge between different topics of the curriculum, connecting the subjects of the

Trivium (Grammar, Rhetoric and Logic). The scholia to the grammar by Dionysius Thrax, for instance, as well as Blemmydes' *Epitome Logica* apply the stoic definition of *techne* to grammar and logic, thus creating an umbrella under which the three parts of the curriculum found a consistent conceptual allocation. The single elements of Zeno's definition, however, *systema*, *katalepsis*, *syngymnasma*, *telos*, could lend themselves to different interpretations, which, in turn, conveyed slightly or vastly divergent attitudes toward rhetoric.

Research has focused on the engagement of Byzantine commentators with these conceptual building blocks, focusing in particular on temporality/directionality and empiricism. In this respect, analysis has profited from the tool of Conceptual Metaphor, developed by Cognitive Linguistics. The definition of *On the Issues* implies the metaphor "knowledge as a journey" and as such prompts thought about progress as well as, from a literary point of view, explains while commentaries are often conceptualized as Odyssean/sea journeys through the text. More to the point, engagements with the opening definition lead commentators from the 11th century onward at least to equate Hermogenes' systematization of rhetoric to Aristotle's "organization" logic, a trend that continues through the centuries and is picked up again in the 13th century by Maximos Planoudes. This important detail could be ascertained by looking at the relevant sections of the still unedited commentary by John Doxapatres, in the version preserved by the ms. Vienna Phil. Gr. 130.

The study of the different stances of commentators toward the epistemic status of rhetoric based on the beginning of *On the Issues* has so far allowed to pinpoint two main exegetical clusters:

- an embodied-empirical approach, according to which rhetoric is quintessentially human and reserved to the articulation of incarnated thought;
- an approach, arguing for the verbal nature of disembodied thought and for the "rhetoricity" of God's mind.

Future research will investigate the implications and consequences of these two stances in relation to other branches of knowledge and geometry in particular.

The methodology outlined proved fruitful. The only drawback was quantitative, in that the amount of relevant material related to the first key passage alone constitutes by itself a substantial corpus in need of interpretation and contextualization.

Second year

During the second year the planned tasks and milestones were:

T1.1.4 To disentangle different theoretical stances in the authorial commentaries and historically contextualize them.

T1.1.5 To trace the historical development of the analytical, empiricist approach to rhetoric across Hermogenes' commentaries.

M1.1.3 Creation of a glossary of "mathematical rhetoric".

M1.1.4 Translation, conceptual mapping and study of the set texts.

M1.1.5 Definition of the textual material to be published on EDIT.

Based on the corpus collected during the first year, research focused on geometrical imagery deployed both conceptually and visually in the Byzantine commentaries on Hermogenes, in particular as far as circular reasoning structures are concerned.

Analysis of Hermogenes and his Byzantine commentators has thus revealed that *ekplexis*, the disturbance produced when entrenched beliefs are overturned was treated as a structured epistemic event. Much more than mere emotional shock, *ekplexis* appears to be a **mechanism for cognitive reorientation**, prompting audiences to reassess assumptions and engage in deeper reasoning. A range of commentators from the late antique Syrianos, Sopatros and Marcellinus to the mid-byzantine John Tzetzes explicitly associate certain rhetorical figures (especially chiasmic and circular periods) with the capacity to induce *ekplexis*, and they restrict their use to deliberative and judicial contexts where cognitive disturbance is desirable. This confirms that rhetorical theory understood persuasion as a controlled modulation of cognitive states, analogous to the role of surprise and contradiction in mathematical problem-solving.

Research conducted within WP 1.1 has shown that Byzantine rhetorical theory relies heavily on spatial and kinetic metaphors of circularity to conceptualize learning and reasoning. The *periodos* is consistently described as a cognitive circuit guiding the reader through a structured loop of argumentation. This circularity is opposed to linear, “wandering” modes of thought and is associated with clarity, boundedness, and demonstrative force. The research demonstrates that Byzantine intellectuals inherited ancient philosophical models of circular cognition – such as the Socratic dialectical approach described in Plato’s dialogues – and repurposed them to articulate a vision of rhetoric as ordered, self-contained, and epistemically stable, mirroring geometrical motion.

A major outcome of WP 1.1 is the demonstration that to Byzantine commentators *periodos* is not just a matter of style but an actual **demonstrative structure** analogous to mathematical proof. Hermogenes already equates the period with the **enthymeme**, the rhetorical analogue of the syllogism. Byzantine commentators expand this equivalence, describing *periodoi* using **geometrical terminology** (equilateral, isosceles, triangular, quadratic) and visualizing them diagrammatically in manuscripts. The analysis of key passages (e.g., Demosthenes *Against Leptines* 19.181) shows that *periodoi* were understood as closed argumentative loops, where cola correspond to geometrical sides, chiasm to symmetrical inversion, and ellipsis to implied premises. This confirms that rhetorical reasoning was conceptualized as mathematical in structure, fulfilling the project’s aim of tracing epistemological contamination between rhetoric and geometry.

Research carried out in WP 1.1 also demonstrates that Byzantine rhetorical pedagogy relied on embodied and spatial cognition, especially in manuscript use. Understanding certain rhetorical diagrams requires physical manipulation of the page, such as rotation, tracing, following circular paths, thus turning reading into a performative act. Visual parallels between cola make logical relations perceptible, confirming that rhetorical learning in Byzantium was multimodal, integrating visual, spatial, and kinesthetic processes.

This aligns with the project’s cognitive-historical methodology and provides a bridge to the visual analysis carried out in WP 1.2. Byzantine commentators did not treat diagrams as neutral pedagogical aids but as active cognitive instruments that shaped how rhetorical theory was understood, processed, and applied. Research conducted by PI extended to the analysis of Paris, BnF Suppl. Gr. 670 to demonstrate how diagrams and visual micro-interventions are key to reveal a sophisticated interplay between visualization, logical conflict, and embodied cognition.

The manuscript contains complex diarectic diagrams summarizing Hermogenes' typologies of definition (*horos*). These diagrams reorganize logical categories spatially, making hierarchy, opposition, and subdivision perceptible through visual form. The diagram dividing definitions "by assessment" and "by judicial judgement" shows that Byzantine compilers used spatial layout to materialize logical distinctions, enabling readers to grasp conceptual relations through visual pathways rather than linear text alone. This confirms that diagrammatic thinking was integral to Byzantine rhetorical pedagogy. A major finding is the discovery that diagrams in Suppl. Gr. 670 are activated by marginal drawings that translate abstract logical conflict (*mache*) into visual form. The reader (whom the study managed to identify as Manuel Kallidras, hieromnemon of Thessalonike in 1380) draws armed warriors directly next to passages where the commentary states "μάχη γίνεται" ("a conflict arises"). These doodles are not random: they function as visual glosses, embodying logical confrontation through martial imagery. This demonstrates that Byzantine readers used images to externalize cognitive tension, turning rhetorical conflict into a spatial and figurative experience. The manuscript thus becomes a site where logical operations are visualized, dramatized, and embodied.

The diagrammatic section on *metastasis* (transference) and *syngnōmē* (mitigation) shows that diagrams also served as arenas of exegetical conflict. Kallidras marks the beginning of a three-folio debate among Hermogenian interpreters with another warrior-saint doodle, signaling that the diagram is not only a classificatory tool but a map of competing interpretations. The compiler of Suppl. Gr. 670 expands the exegetical tradition by adding sources absent from the scholia P (e.g., Menander, Phoibammon, Sopatros) and by proposing his own solution. The diagram thus becomes a **visual index of disagreement**, capturing the dynamic, multi-voiced nature of Byzantine rhetorical theory. Research confirms once again that diagrams often require **physical manipulation** of the manuscript. Several marginal glosses only become legible when the page is turned upside down, revealing that the reader treated the margins as an independent cognitive space. The diagrammatic evidence from Suppl. Gr. 670 strengthens WP 1.1's central findings.

In sum WP 1.1 establishes the conceptual foundation for the entire project by showing that Byzantine intellectuals designed rhetoric as a discipline of necessary reasoning, mathematical in structure, cognitive in effect, and embodied in practice. It has also shown that diagrams and visual micro-texts in Middle Byzantine Hermogenean manuscripts are not peripheral artifacts but central cognitive tools. They reveal how Byzantine intellectuals thought with images, structured conflict visually, and used diagrammatic reasoning to reinforce the epistemic force of rhetoric and persuasion at large.

The material selected for M1.1.5 reflects these findings. The selection had to meet two requirements: 1. A broad chronological representation; 2. Suitable license for reuse. According to these criteria we selected the following manuscripts:

- Parisinus Graecus 1983 (one of the oldest testimonia of Hermogenes, 10-11thc., containing the late-antique exegetical apparatuses known as *scholia P*)
- Vienna, Phil. Gr. 300 (14th century containing an abridgement of John Tzetzes' commentary on Hermogenes including diagrams designed for pedagogical use)
- Parisinus Graecus Suppl. 670 (commentary on Hermogenes by the 11th century containing 14th century marginalia where doodles and diagrams intersect)

- Vienna, Suppl. Graec. 75 (the personal workbook of the Byzantine intellectual and metropolite John Chortasmenus, ca. 1370–1436/37, whose rhetorical parts have been disregarded, although the manuscript itself is quite famous among Byzantinists: Chortasmenos produces a true diagrammatic commentary to Hermogenes).

What we propose for EDIT is an overview similar to those produced for the Latinate West in <https://art-of-reasoning.huygens.knaw.nl/>

1.4 Research WP 1.2 - progress

First year

As responsible of WP 1.2, the central focus of Chiara D'Agostini's research activity from September 2022 has been the investigation of the visualization tools, mainly diagrams, present in the manuscripts of the *corpus Hermogenianum* and its middle Byzantine commentaries (843-1204). Especially in the first months (M1-5), the research work proceeded in parallel between two main tasks: on the one hand, to thoroughly reviewing the existing literature on Byzantine rhetoric – with an emphasis on the *corpus Hermogenianum* – and, on the other, to familiarize with the different typologies of diagrams found in the manuscripts. This twofold undertaking, though demanding, has allowed me to test some working hypotheses as well as to provide sounder theoretical and methodological grounds and more informed directions to my research already from the beginning of the project. For instance, one of the working hypotheses concerned the possibility of analyzing diagrams independently in each of the five treatises constituting the so-called *Corpus Hermogenianum* (Aphthonios' *Progymnasmata*, Hermogenes' *On Issues*, pseudo-Hermogenes' *On invention*, Hermogenes' *On Forms* and pseudo-Hermogenes' *On the method of force*). Although this methodology would have facilitated – at least at first – the organization of the study given the modularity of the material itself, it did not prove the best approach: firstly, diagrams are not always consistent both in terms of presence and of typology, and secondly, diagrams related to one treatise can be found – misplaced in some cases so to say – positioned at a certain distance from the text they mainly refer to. With such an analysis, thus, this kind of instances would have gone inevitably lost. Instead, I decided to favor a more integrated and comprehensive approach, considering diagrams as a whole group, as a galaxy of reactions to the *corpus Hermogenianum* as they visually encapsulate its text.

In October, PI and I travelled to Berlin for our research stay at the Max Planck Institute for the History of Science. This research stay took place earlier than planned (M2 instead of M4) as during that month not only Dr. Divna Manolova (visiting fellow at Dept. III Artifacts, Action, Knowledge, member of NbD Advisory Board) was there, but also Prof. Serafina Cuomo (Durham University, member of NbD Advisory Board) spent a few weeks there as visiting scholar. This proved an excellent opportunity to meet in person with two members of the NbD Advisory Board and to discuss the foundations as well as the preliminary stages of the project. With their broad expertise in the interactions within diagrams and texts (Manolova) and in the history of science (Cuomo), they provided invaluable advice, specific methodological and bibliographical suggestions (just to mention a few titles: J.-C. Schmitt, *Penser par figures: Du Compas Divin aux Diagrammes Magiques*, 2019; A. Even-Ezra, *Lines of Thought: Branching Diagrams and the Medieval Mind*, 2020; J. Acevedo, *Alphanumeric Cosmology from Greek into Arabic: The Idea of*

Stoicheia Through the Medieval Mediterranean, 2020), and constructive feedback to the project. Key points addressed during the meeting discussion, for instance, concerned the difference between lettered and non-lettered diagrams, the definition and the implications of the concept of ‘visualization’, and the advantages and disadvantages of a typological approach.

Beyond the few meetings we arranged with Cuomo and Manolova, during the visit we had also the possibility to present our project to other members of the Max Planck Institute for the History of Science (Dept. III, working group Visualization and Material Cultures of the Heavens in Eurasia and North Africa [4000 BCE–1700 CE]), arranged by Manolova (7th October 2022). We had a lively and stimulating discussion on the connections between rhetoric and philology and on the role of geometry as a component of language, both verbally and visually. While in Berlin, moreover, we could deeply benefit from the rich library collection of the Staatsbibliothek where I was also able to inspect the manuscript Hamilton 537 (409). This 14th-century manuscript features Porphyry’s *Isagoge* and David’s commentary to the *Isagoge* and to Aristoteles’ *Categories* and, even though it is a philosophical manuscript, a large number of diagrams, especially diairetical, features in it. This examination proved very helpful as a first step for the investigation of the relationship(s) between rhetorical, logical and geometrical visualization tools. All things considered, the research stay in Berlin was extremely fruitful and rewarding and proved an excellent kick off to start the project.

After the preliminary stages of the project, my work has been mainly devoted to the gathering and the examination of the different typologies of visualization tools present in the manuscripts of the *corpus*. This work has contributed to three crucial objectives of the project:

- to widen the preliminary dataset of diagrams encompassed in manuscripts containing Hermogenes and/or his commentators. This was the result of a pilot project led by the PI and constituted the point of departure for the WP1.2;
- to propose a classification of the rhetorical diagrams of the *corpus*;
- to study changes, contaminations, and variations within the different typologies.

The two latter objectives, in particular, are the main focus of the chapter I wrote on “Byzantine rhetorical diagrams in the *corpus Hermogenianum*: preliminary remarks” and which will be part of a collected volume titled *The Corpus Hermogenianum and its Exegetical Tradition in the Middle Byzantine Period* edited by PI Aglae Pizzone (Palgrave-Springer, expected publication date 2025 – **update published 2026**). This chapter was also discussed during the “Kick-off Workshop: A Rhetoric for the Empire” which took place in Odense (University of Southern Denmark) from 13th to 16th June 2023. PI’s new project “A Rhetoric for Empire: Education, Politics and Speech-Making in The Byzantine Millennium”, funded by The Carlsberg Foundation and starting in September 2023, ties very well with the NbD project. This project has in fact the objective to explore how the culture of the Byzantine Empire productively and innovatively navigated the notions of rhetoric, politics, ethics, and truth by engaging with the *Corpus Hermogenianum*. The two projects look at two different features of and in the same *corpus* so they complement and support each other.

After this phase, the focus of my research has shifted to consider specific case studies which were examined to illustrate how visualization fosters understanding and lines of argumentation.

Throughout all the year, my research work has been pursued independently with the constant support and feedback by PI Aglae Pizzone. We met at least once per month either in

person or online, but email communication and exchange has been continuous so as to make sure that the work could proceed in parallel.

Second year

Proceeding along the same lines, the second year of the project focused on deepening the analysis of the visualization tools in the context of rhetorical, logical, and geometrical reasoning. Building on the foundational work completed in the first year, my work sought to address two main tasks:

- T1.2.4: Investigating the relationship between rhetorical, logical, and geometrical visualization tools.
- T1.2.5: Examining how visualization tools contribute to and intersect with debates on the epistemic status of rhetoric.

This phase aimed to consolidate theoretical frameworks, explore practical examples, and contribute novel insights to ongoing scholarly discussions, revealing intricate connections between visualization techniques used across different domains. In particular, I deepened my research focusing on different case studies so as to provide a tangible basis and meaningful context for discussing the shared and distinctive features of visualization tools in rhetoric.

Key case studies, for instance, included the following:

- a) the Euclidean diagram referred to the first proposition in the Euclid's *Elements* (an equilateral triangle built starting from a segment AB through two circumferences) in the 11th-century manuscript Florence, BML plut. 60.15 which hands down the whole *corpus Hermogenianum*. The analysis of this diagram has led my research to concentrate on the rhetorical figure of the *kyklos*, the circular figure, and to its discussion in the *corpus* (*On invention* III.8) and its commentaries. A comparative analysis was conducted, highlighting overlapping and diverging characteristics of the diagrammatic tools used to visually represent this specific figure and of the different places where it appears in the manuscript tradition. This case study helped, first, to better understand the didactic function of a specific rhetorical figure and, second, to investigate the connection between rhetorical and geometrical tools.
- b) the diagrammatic representation of Hermogenes' *staseis* system, a diagram illustrating the division of the thirteen Hermogenian *staseis* – as illustrated in the treatise *On Staseis* (e.g. ms. Paris. gr. 1983 at fol. 8v). Many manuscripts contain at the very beginning this tree-like diagram often occupying an entire page, branching from most abstract concepts into more concrete examples. The dialectical process of division into *staseis* is driven by questions which, when aptly posed, allow rhetors to find the *stasis* more fitting for each context. Examining this visualization tool, widely used and essential but often conveyed in different forms, provided an opportunity to test and further refine the proposed conceptual framework, prompting discussion on key concepts such as abstraction, simplification and engagement. In some cases, moreover, it was possible to investigate how visualization tools shaped and are shaped by the epistemic debates surrounding rhetoric, such as the case of the diagram in the ms. Leiden, Vossianus gr. Q 1.

Also in the second year, the NbD project has actively collaborated with a sister initiative – led by PI and established in September 2023, the project “A Rhetoric for Empire: Education, Politics and Speech-Making in The Byzantine Millennium”, funded by The Carlsberg Foundation. Both projects aim to explore how the culture of the Byzantine Empire productively and innovatively navigated the notions of rhetoric, politics, and ethics by engaging with the *Corpus Hermogenianum*. This collaboration has allowed for a synergistic exchange of insights and resources, enhancing the depth and scope of our investigations. This partnership has been enriched by the exchange of ideas during various interdisciplinary workshops, where researchers from both projects engage in productive dialogue, share findings (see below dissemination), and refine methodologies. These workshops (M16, M18 & M22, see below) served as a dynamic platform to align efforts, enhance interdisciplinary understanding, and advance the overarching goals of both projects, creating a cohesive and impactful research network.

In January 2024 (M17), PI and CdA travelled to Paris for the project’s second research stay. During our stay in Paris, we had the privilege of accessing the rich collections of the Bibliothèque nationale de France (BnF). Among the many valuable resources which significantly enhanced my research, I focused on rhetorical manuscripts of the *corpus Hermogenianum* (e.g. Paris. gr. 2977, Paris gr. 2916) not available in high resolution online and which offered unique insights into the use of diagrams in rhetoric. The library’s extensive holdings provided a wealth of material for advancing our investigation into the intersections between rhetorical, logical, and geometrical visualization tools. Moreover, this stay in Paris proved to be productive and intellectually stimulating, offering crucial support for the development of the project and also an excellent opportunity to meet in person with two members of the NbD Advisory Board: Dr. Divna Manolova (Observatoire de Paris, EIDA project) and Prof. Giovanna Cifoletti (École des Hautes Études en Sciences Sociales [EHESS], Centre Alexandre-Koyré). Not only both shared their expertise with us, providing advice and valuable feedback on our work, but they also respectively organized a short presentation of our project within the context of the monthly EIDA seminar (23rd January) and a workshop on the concept of “distance” (18th January). Both events provided an excellent platform for presenting our project to a broader and more interdisciplinary audience; they facilitated lively discussions, allowing us to exchange ideas, gather feedback, and explore new perspectives. This outreach not only improved the visibility of our project but also strengthened its interdisciplinary connections, fostering collaborations and expanding its intellectual impact.

The visibility of the project has been enhanced also thanks to the following initiatives:

- Lecture sponsored by the Danish Institute for Advanced Study organized by PI Aglae Pizzone with prof. Giovanna Cifoletti (Ecole des Hautes Etudes en Sciences Sociales, Centre Alexandre-Koyré Paris), member of NbD Advisory Board. The lecture was combined with a workshop of PI’s project “A Rhetoric for the Empire” thus offering the possibility to discuss the progress of our work in a stimulating environment.
- Workshop “Thinking through Rhetoric: The *Corpus Hermogenianum* in Byzantium”, 16th February 2024, Biblioteca Nazionale di Napoli Vittorio Emanuele III, Naples; PI and postdoc presented the project in a joint panel, exploring graphic and discursive practices used in Hermogenes’ system of *staseis*.
- International interdisciplinary panel at the International Medieval Conference in Leeds (1-4 July 2024), Thursday 4th July 2024, Session 1518 - Imaginary Lines: Rethinking

Knowledge Representation in Byzantium – with Dr. Renate Burri (Österreichische Akademie der Wissenschaften-Wien), Dr. Divna Manolova (Observatoire de Paris, CNRS, SYRTE - Systèmes de Référence Temps-Espace) and Ugo Valori (Università degli Studi di Milano/Syddansk Universitet).

- Panel “New Approaches to the Corpus Hermogenianum in Byzantium (11th and 12th century)” at the 24th Biennial Conference of the International Society for the History of Rhetoric (ISHR), University of British Columbia and Simon Fraser University, Vancouver, Canada (23-26 July 2024) – with PI PI Aglae Pizzone, Manfred Kraus (University of Tübingen) and Elisabetta Barili (University of Southern Denmark).

Thanks to the research pursued in this project, visualization tools emerged as key players in epistemic discussions in rhetoric, with their dual capacity to clarify and persuade. The project proposed a conceptual framework to categorize these tools based on connection and the kind of relationship these tools express. Bridging different disciplines and perspectives, our research advanced the understanding of visualization tools in relation to rhetoric and epistemology. These findings provide a foundation for future work, including the dialogue on the epistemic implications of visualization in knowledge practices.

2. Deviations from plan

The project has been running roughly as planned and the first results of research have been achieved without experiencing any major deviation from the plan of WP₁, the one devoted to research (see below 4. Outputs and Dissemination). It was however necessary to make small adjustments to the main plan or to slightly change the provisional schedule of some tasks as they could not be completed in the original timeframe (WP₂ and WP₃). In any event, along the year both PI and I have been constantly working to ensure the smooth operation of the project so as to make sure that all the goals will be achieved and, if not the promised ones, the same number of dissemination activities will take place.

The field trips were slightly postponed mainly due to change of circumstances (e.g. presence of members of the NbD Advisory Board in specific periods): M2.1 – Berlin took place in M2 instead of Month 5; M2.2 – Paris took place in M17 instead of M13; M2.3 was not implemented as a continuous research stay, but thanks to personal connections, both PI and postdoc had the chance to travel often to the city and had the chance to work on the manuscripts held by the main libraries.

In terms of dissemination, there were a few changes due to unforeseeable circumstances (e.g. ESHS Early Career Scholars Conference planned for M14 did not take place), but the number of activities (workshop presentations, conferences, etc.) did not change.

The planned international interdisciplinary conference at the end of the funding period was bringing together ancient and early modern historians of mathematics was instead anticipated at M19 with the workshop in Naples where many colleagues from an interdisciplinary background conveyed and actively contributed to the discussion.

Milestone 1.1.3 originally envisaged the production of a glossary of “mathematical rhetoric,” but the research showed that this approach was conceptually too flat to capture the real dynamics at play. The intersections between rhetoric and mathematical thinking in the Byzantine Hermogenean tradition do not primarily reside in terminology but in **modes of**

reasoning—in how arguments are structured, visualized, and operationalized through diagrams, logical conflict, and circular demonstrative patterns. As a result, the milestone was adjusted to focus on these cognitive and structural intersections rather than on lexical correspondences.

In terms of publications, we decided to turn the D3.1.2, a co-written journal article (AP and CDA), into a co-written monograph (instead of D3.2.2). We had the opportunity to discuss the foundations and the preliminary ideas of the book – and even a tentative table of contents – in the context of one of the workshops organized under the umbrella of the project “A Rhetoric of the Empire”. However, the change of plan inevitably postponed the following steps, so we are slightly late with the last promised deliverable. The book proposal is now in preparation and plans are in place for submitting the first drafts within the next two years.

3. Outputs and Dissemination

Both research outputs and dissemination activities reflect the work on the NbD project as well as the ongoing work on CdA PhD dissertation titled “Mapping Empires. Re-appropriations of Ptolemy’s *Geography* from the 12th to the 15th century”.

Research Outputs

One article has been submitted for publication and a monograph coauthored with PI is currently in preparation.

Published

- D’Agostini Chiara “Reading the Ptolemaic *oikoumene* in the late 13th-century Constantinople: between science, cultural appropriation and politics”, in N. Bianchi and M. Duluş (eds.), *Legacies and Entanglements: Religious Identity, Cultural Tradition and Political Order in the Byzantine Sphere*, special issue *Études byzantines et post-byzantines* V (XII), 2023: 187-210.
- D’Agostini Chiara “Euclid out-of-place? A Geometrical Diagram in a Manuscript of the *corpus Hermogenianum*.” *Greek, Roman, and Byzantine Studies* 64.3 (2024): 456-479. <https://grbs.library.duke.edu/index.php/grbs/article/view/17021>.
- D’Agostini Chiara “Constructing Maps: On Three Geographical Illustrations in a 13th-Century Byzantine Manuscript”, in L. Andersen, J.J.H. Christensen, R. Vangshardt (eds.), *Polyfemos. Festschrift in Honour of Christian Høgel*, Copenhagen: Forlaget Atalante, 2024: 48-72.

Submitted:

- (*forthcoming 2025 update published 2026*) “Visualization Strategies in the corpus Hermogenianum: Preliminary Remarks on Byzantine Rhetorical Diagrams”, in A. Pizzone (ed.), *The Corpus Hermogenianum and Its Exegetical Tradition in the Middle Byzantine Period*, New Approaches to Byzantine History and Culture. Cham: Palgrave Macmillan.
- (*forthcoming 2025 update published 2026*) Pizzone Aglae, “Guided by Method: Spatial and Temporal Negotiations of *Technē* in the Byzantine Hermogenian Tradition”, in A.

Pizzone (ed.), *The Corpus Hermogenianum and Its Exegetical Tradition in the Middle Byzantine Period*, New Approaches to Byzantine History and Culture. Cham: Palgrave Macmillan, 47-81.

- Pizzone Aglae, 'Doodles and micro-texts in the Paris, Bibliothèque Nationale de France, Supplementum Graecum 670 (diktyon 53405)', in E. Cingano-E.E. Prodi (edd.), *Commentaries on Greek Texts: Problems, Methods, and Trends of Ancient and Byzantine Scholarship*, Venezia: Edizioni Ca' Foscari forthcoming.

In preparation:

- Co-authored monograph with PI (working title): *Diagrams and their underpinnings in the corpus Hermogenianum: cognitive value, theoretical aspects and multidisciplinary interactions in the middle Byzantine period*.

Conferences and workshop presentations (title of event, venue, date and talk title):

- Pizzone Aglae, Inaugural Lecture, Epistemic shock, the Greek way. How to unsettle knowledge and promote change, 23rd September 2024, University of Southern Denmark.
- 24th Biennial Conference of the International Society for the History of Rhetoric (ISHR), University of British Columbia and Simon Fraser University, Vancouver, Canada (23-26 July 2024: Thursday 25th July 2024) – paper: D'Agostini Chiara, *Figures, Conceptualisation and Mediation Tools: The Role of Diagrams in the 'Corpus Hermogenianum'*.
- Summer School: History of Science in the Medieval World, organized by University of Veliko Tarnovo "St. Cyril and St. Methodius" with Academic Theatre Ikaros and in cooperation with International Summer Seminar in Bulgarian Language and Culture – 2nd Edition, 15–19 July 2024: 16th July 2024), Veliko Tarnovo, Bulgaria – online lecture "Exploring Byzantine Geography: Challenges and Opportunities.
- International Medieval Conference, Leeds (1-4 July 2024), Thursday 4th July 2024 Session 1518 - Imaginary Lines: Rethinking Knowledge Representation in Byzantium (panel organised by Chiara D'Agostini and Aglae Pizzone) – paper D'Agostini Chiara: *Mathematical Diagrams in Rhetoric: The Case of MS Firenze, Biblioteca Medicea Laurenziana, Plut. 60.15*.
- 4th Workshop "A Rhetoric for the Empire", 11th June 2024, Athens, Danish Institute at Athens – paper (with Aglae Pizzone): *The Corpus Hermogenianum through its diagrams. Preliminary thoughts on a book project*.
- Workshop "Thinking through Rhetoric: The Corpus Hermogenianum in Byzantium", 16th February 2024, Biblioteca Nazionale di Napoli Vittorio Emanuele III, Naples – paper: *Visualising Rhetoric: Diagrams in the 'Corpus Hermogenianum'*.
- [AntCom Winter School](#): online lecture, 6th February 2024: "Spatial Turn in Humanities".
- Workshop "Atelier - Savoir situés de la distance", 18th January 2024, Ecole des Hautes Etudes en Sciences Sociales, Paris, papers: D'Agostini Chiara, *The measure of geography in 12th-century Byzantium: space, rhetoric and diagrams*; Pizzone Aglae, *Espace de raisonnement : l'hypographé entre les mots et les lignes*.
- Presentation of the project (Aglae Pizzone, Chiara D'agostini) at the [EIDA] History of Astronomical Diagrams Seminar, Paris, 23rd January 2024.

- 2nd Workshop A Rhetoric for the Empire (7-8 December 2023), 07.12.2023, Odense (SDU Campus) – paper: *Euclid out-of-place? On a geometrical diagram in a middle Byzantine manuscript of the ‘corpus Hermogenianum’*.
- International Medieval Conference, Leeds (3-6 July 2023), Thursday 6th July 2023, Session 1715 – Sino-Byzantine comparisons, Eurasian Entanglements, III: Creating Networks of Reference (panel sponsored by ERC Project PAIXUE – Classicising learning in medieval imperial systems: Cross-cultural approaches to Byzantine paideia and Tang/Song Xue); D’Agostini Chiara, *Learning geography in 12th-century Byzantium: alternative models, interconnected networks*.
- Kick-off Workshop: A Rhetoric for the Empire (13-16 June 2023), Odense (SDU Campus & Convent of Noble Maidens); D’Agostini Chiara and Aglae Pizzone, *Necessity by design: looking at the mathematics of rhetoric in Middle Byzantine culture through its visualizations strategies*.
- Kick-off Workshop: A Rhetoric for the Empire (13-16 June 2023), Odense (SDU Campus & Convent of Noble Maidens), Thursday 15th June 2023; *presentation and discussion of the paper “Byzantine rhetorical diagrams in the corpus Hermogenianum: preliminary remarks”*.
- Field trip to Berlin, Max Planck Institute for the History of Science, (7th October 2022); *presentation and discussion of the project, together with PI Aglae Pizzone*.

Online presence

The project has a FB page <https://www.facebook.com/profile.php?id=100089844990029> and a website (www.byzherm.com).